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SUBJECT: Climate Change Impacts, Adaptation and Mitigation in  
Kwazulu-Natal Province

¶1. Summary. EST Officer met with KwaZulu-Natal (KZN) Department of Agriculture and Environmental Affairs (DAEA) Environmental Services (South Region) Manager Sharon Allan to discuss climate change impacts, adaptation and mitigation within KZN province, with an emphasis on the eThekweni Municipality (metropolitan Durban and suburbs). EThekweni Municipality commissioned a 2004 climate change study which predicted serious climate change impacts, including temperature variations and extreme changes in rain and sea levels. Allan noted that erosion and sea level rises have already caused negative impacts in the northern suburbs. EThekweni has identified 65,000 hectares of open space available for carbon capture. EThekweni has several existing climate change adaptation programs, including the Water and Sanitation Water Loss Management Project, the Waste Water Education program, and the Coastal Storm Water and Catchment Management programs. The Parks, Leisure and Cemeteries Department, the Working for Water Program and the Environmental Management Department (EMD) have partnered to control and eradicate alien invasives. End summary.

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EThekweni Facing Climate Change Impacts  
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¶2. A 2004 climate change study by the eThekweni Department of Agriculture and Environmental Affairs (DAEA) predicted that daily maximum temperatures in the region will increase 2-3 degrees Celsius within the next twenty years. Daily minimum temperatures will increase 3-4 degrees Celsius; heat waves over 30 degrees Celsius will occur during the summer season (October to March). The study noted that rain will increase in certain areas, causing heavy floods while other areas will experience longer dry periods, resulting in drought. The study advised that sea levels will rise 2.5 cm every ten years.

¶3. The DAEA study predicted that extreme heat would cause major negative health impacts on young and old and that increased rainfalls would amplify incidents of vector-borne diseases (e.g., malaria) and water-borne diseases (e.g., cholera). The study said that cities should expect decreased water supplies due to diminishing water levels in dams resulting from irregular rainfall and increased evaporation. The study advised that high temperatures, declining water availability and increasing water evaporation would reduce agricultural productivity and intensify topsoil erosion while extreme rainfall in other areas would cause flooding. The study concluded that ecosystems favoring indigenous species could be severely compromised due to erosion, floods, sea level rises and the proliferation of alien species. The report noted that sea level rises and increased flooding would impact infrastructure, including residences and key industries located in low-lying areas.

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EThekweni Already Experiencing Negative Impacts  
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¶4. EST Officer met with KwaZulu Natal (KZN) Department of Agriculture and Environmental Affairs (DAEA) Environmental Services (South Region) Manager Sharon Allan to discuss climate change

impacts, adaptation and mitigation within KZN Province, with an emphasis on the eThekweni Municipality (metropolitan Durban and suburbs) on March 31, 2008. Allan advised that infrastructure and housing in the Durban northern suburbs had already experienced Qhousing in the Durban northern suburbs had already experienced damaging erosion from climate events. She emphasized that the disastrous March 2007 weather events could reoccur at any time. (Note. In March 2007 three cyclones in the Indian Ocean created an extreme cut-off, low-pressure system while a simultaneous extreme high-tide event occurred. That weather combination resulted in damage to homes, business and infrastructure in the Durban area, and brief closure of the city's economic hub - its port. End Note.)

15. Allan said the first step in resolving climate challenges is acknowledging their existence. She noted that the city had commissioned several greenhouse gas (GHG) emissions studies. A 2006 study estimated that the eThekweni municipal area emitted 17.8 million tons of CO2 per year, which is five percent of South Africa's total CO2 emissions. Industry, commerce and local agriculture sources account for 53% of all emissions, 26% derive from transport, and local government accounts for 3%. Electricity, predominantly from coal-burning power plants, causes more than half of all emissions. According to a 2007 report, "renewable energy is almost non-existent in Durban.

#### ----- Sequestration Activities in eThekweni -----

16. Allen said eThekweni has considered sequestration and storage for CO2, identifying 65,000 hectares of available open space, including grasslands, wetlands, beaches, rivers and estuaries. Allan said the vegetation and soils of these open spaces has been inventoried and found to capable of storing 6.6 million tons of carbon, or 24.3 million tons of CO2. Allan noted that some of these open systems grow biomass, which the city estimates sequesters about 31,000 tons of CO2 per year.

17. The eThekweni Environmental Management Department (EMD) is implementing the eThekweni Environmental Services Management plan (EESMP) which seeks to expand open spaces within the city. Allan notes that these open spaces provide ecosystem services such as erosion prevention, storing and filtering water, and city cooling. These services will be even more important if the temperature rises as predicted.

18. Allen noted that many of the mature spaces may have reached saturation and are not capable of storing additional carbon. Predicted future changes in temperature and rainfall could cause some ecosystems to sequester carbon at higher or lower rates. (FYI. Wetlands store large amounts of carbon because organic material decomposes slowly in waterlogged soil due to the lack of oxygen. As wetlands dry out they lose this ability. End FYI.) Allen noted that approximately 58 percent of the municipality's carbon pool is stored on land that could potentially be developed. Protecting these areas will become increasingly important, as well as rehabilitating land infested with alien species.

#### ----- Mitigation Activities in eThekweni -----

19. Allen commented that sequestration will never alleviate the entire region's CO2 output. She said the area must consider mitigation. Allen noted that the city planners have advised that the adoption of an efficient public transport system and the use of renewable energy would be the most effective mitigation techniques. Allen said the city has conducted energy audits for municipal buildings and implemented air conditioning cut-backs, reducing energy use by more than fifteen percent.

110. Allen emphasized that eThekweni's landfills produce large amounts of methane gas (CH), which is stronger than GHG. Allen noted that methane is highly flammable and flared periodically to prevent methane build-ups, which produces CO2. Allen advised that the energy produced by flaring at Marianhill, La Mercy and Bissar Road landfills is converted into electricity (approximately 10 MW).

Credits for these reductions are sold internationally via the Kyoto Protocol's Clean Development Mechanism (CDM).

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Adaptation Activities in eThekweni  
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¶11. Allan noted that eThekweni has several existing climate change adaptation programs. The eThekweni Water and Sanitation (EWS) Water Loss Management Project improves water pressure control, and conducts leak surveys. The EWS Waste Water Education program educates communities about preventing sewage blockages and leaks. Allan advised that EWS programs also encourage water recycling and filtering to make water suitable for drinking or agriculture. Allan said EWS promotes water storage and rainwater catchment areas, and is developing systems that use grey-water (used water) for toilets. EWS now requires that all new developments use low flush toilets. Allan commented that EWS is completing an assessment of the effects that increased heat, storms and sea levels will have on water provision and the sanitation infrastructure with a view towards making recommendations on where infrastructure upgrades or relocations should be made.

¶12. Allan advised that eThekweni Coastal Storm Water and Catchment Management (ECSCM) is reassessing areas vulnerable to flooding using predicted future rainfall. ECSCM requires storm water management plans for all new developments. Allan said that ECSCM hopes to prevent further development in areas that would be affected by 1:50 year storms and 50-year, sea-level rises. ECSCM is developing flood prevention and emergency response plans to meet climate change scenarios.

¶13. Allan said the eThekweni Urban Agricultural Programs (EUAP) support community farming initiatives and promote workshops on the use of drought-resistant crops, erosion prevention and efficient water use. The Parks, Leisure and Cemeteries Department, the Working for Water Program and the EMD have partnered to control and eradicate alien invasives, which often use excessive water, degrade local soils, out-compete indigenous species, and lead to degraded habitats.

¶14. Allan said the Health Department has predicted that more areas will be vulnerable to malaria and early identification of these areas will help target malaria prevention programs, including mosquito eradication. The KZN Health Department is also working to secure sustainable energy and clean water sources for healthcare, and to identify the size and distribution of groups within the city that are vulnerable to climate change impacts (children, elderly, and immune-compromised). Allan noted that the KZN Health Department hopes to develop city-wide heat emergency plans and to initiate education campaigns about heat stress and environmental problems associated with excessive heat.

¶15. Allan noted that eThekweni would like to ensure that new or upgraded infrastructure such as roads, electricity lines or landfills are not located in floodplains and that builders use construction materials appropriate for increased temperatures. She indicated that the municipality should also prevent new developments in potentially hazardous areas by rezoning those areas.

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Comment: First Steps Taken; More Remains To Be Done  
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¶16. Comment: eThekweni has done a commendable job in acknowledging and assessing potential climate change impacts. Preliminary steps have been taken, but more concrete actions will be needed, especially if the predicted health and infrastructure impacts become a reality. The real test will come when development and industry come into direct conflict with climate change priorities and assessments. The March 2007 environmental and economic damages caused by a convergence of climatic events should serve as a reminder of what can happen if nothing is done. End comment.